



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,801	07/23/2003	Anthony C. Zuppero	22122878-70	9026
26453	7590	05/12/2005	EXAMINER	
BAKER & MCKENZIE LLP 805 THIRD AVENUE - 29TH FLOOR NEW YORK, NY 10022			DIAMOND, ALAN D	
			ART UNIT	PAPER NUMBER

1753

DATE MAILED: 05/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/625,801

Applicant(s)

ZUPPERO ET AL.

Examiner

Alan Diamond

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on February 9 and 14, 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 32,34,35,39-41,43-50,52-54,56-77,79,81-89 and 92 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 32,34,35,39-41,43-50,52-54,56-77,79,81-89 and 92 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/22/04, 02/09/05, 03/17/05
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submissions filed on February 9 and 14, 2005 have been entered.

Comments

2. The rejection of claims 33, 36-38, 42, 78, and 80 under 35 USC 112, first paragraph, has been overcome by Applicant's cancellation of these claims.
3. The rejection of claims 78 and 80 under 35 USC 112, second paragraph, has been overcome by Applicant's cancellation of these claims.
4. The obviousness-type double patenting rejections over the claims of U.S. Patents 6,114,620, 6,222,116, 6,218,608, 6,268,560, 6,327,859, and 6,700,056 are expressly withdrawn by the Examiner because the claims of said patents do not form a thin electrically conducting surface on one or more semiconductor elements, the thin electrically conducting surface and the one or more semiconducting elements forming a semiconductor diode, and wherein one or more highly vibrationally excited reaction products transfer reaction product energy to electrons in the thin electrically conducting surface, which electrons become energetic, travel into the one or more semiconductor elements and produce electricity. Furthermore, it should be noted that, even if said

Art Unit: 1753

patents had a publication date that permitted them to be used as prior art against the instant claims, none of said patents anticipates or renders obvious the instant claims.

The closest subject matter with respect to the instant claims is found in Figure 1 of each said patents. Said Figure 1 has a substrate diode (109), a catalyst layer (105), a metal interlayer (106) and non-conducting layer (107). Neither the catalyst (105) nor the metal interlayer (106) is part of or forms the diode (109). Although transfer of reaction product energy from highly vibrationally excited reaction products to electrons is not discussed in said patents, it does not occur in any layer or part that forms the diode (109). If anything, it would occur at layers (105) and (106). An example of the instant invention can be seen in Figure 3 and is discussed at pages 22 and 23 of the instant specification. In particular, conducting electrode (110) corresponds to the instant thin electrically conducting surface and forms part of the diode with semiconductor layers (111) and (104) (see pages 22-23). Furthermore, hot electrons are created on the surface of the layer (110) (see page 23, line 20).

5. The obviousness-type double patenting rejection over the claims of U.S. Patent 6,678,305 is expressly withdrawn by the Examiner because the claims of patents do not form a thin electrically conducting surface on one or more semiconductor elements, the thin electrically conducting surface and the one or more semiconducting elements forming a semiconductor diode, and wherein one or more highly vibrationally excited reaction products transfer reaction product energy to electrons in the thin electrically conducting surface, which electrons become energetic, travel into the one or more semiconductor elements and produce electricity.

6. The provisional obviousness-type double patenting rejections over copending application Serial Nos. 09/682,363, 10/185,086, and 10/218,706 are expressly withdrawn by the Examiner because the claims of said copending applications do not form a thin electrically conducting surface on one or more semiconductor elements, the thin electrically conducting surface and the one or more semiconducting elements forming a semiconductor diode, and wherein one or more highly vibrationally excited reaction products transfer reaction product energy to electrons in the thin electrically conducting surface, which electrons become energetic, travel into the one or more semiconductor elements and produce electricity.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 41, 43-45, 48-50, 56, 59, 63, 64, 66, 73, 74, 76, 77, and 92 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 41, periodically varying the bandgaps for forming quantum wells with energy levels chosen to match one or more energy levels of the products of the chemical reactions is not supported by the specification, as originally filed.

Art Unit: 1753

In claim 43, a semiconductor comprising "germanium and silicon and the composition of silicon is varied" is not supported by the specification, as originally filed.

In claim 44, at line 3, the "conduction" for cooling the one or more semiconductor elements is not supported by the specification, as originally filed.

In claim 45, the capacitor and the combination of the capacitor and the semiconductor diode are not supported by the specification, as originally filed. The same applies to dependent claims 46 and 47.

In claim 48, the heat of vaporization of one or more "reactants", "liquids", or "additives" or any combination of these with anything else is not supported by the specification, as originally filed

In claim 49, the convective flow "using a flow of air, the reactants, the products of chemical reactions, fuels, liquids, or additives, or combinations thereof" is not supported by the specification, as originally filed. The specification teaches that heat may be removed by convective action of the gas flow **109** (see the paragraph bridging pages 24 and 25). The gas flow **109** is the exhaust products (see page 21, lines 15-22). The recitation of using the convective flow of exhaust products is not sufficient support for "using a flow of air, the reactants, the products of chemical reactions, fuels, liquids, or additives, or combinations thereof".

In claim 50, the "heat pipe" at line 2 is not supported by the specification, as originally filed.

In claim 56, the conveying by "pulsed delivery" (see line 2) is not supported by the specification as originally filed.

In claim 59, at line 5, the "or combinations thereof" is not supported by the specification, as originally filed.

In claim 63, at line 5, the "or combinations thereof" is not supported by the specification, as originally filed.

In claim 64, tailoring performed intermittently in pulses or periodically is not supported by the specification, as originally filed.

In claim 66, at line 2, "periodic pulses of H₂O₂" is not supported by the specification, as originally filed.

In claim 73, the "applying periodic stimulation to the thin electrically conducting surface" at lines 2-3 is not supported by the specification, as originally filed.

In claim 74, at line 2, the "ultrasonic" is not supported by the specification, as originally filed

In claim 74, at line 3, the "combination thereof" is not supported by the specification, as originally filed.

In claim 76, at line 2, the "unstable energetic specie, or combination thereof" is not supported by the specification, as originally filed.

In claim 77, the "high explosives, or combinations thereof" is not supported by the specification, as originally filed.

In claim 92, at lines 2-3, the requirement that at least one of the semiconductor elements has a bandgap greater than bandgaps of rest of the semiconductor elements is not supported by the specification, as originally filed.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

Art Unit: 1753

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 39-41, 43, and 65-67 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 39 is indefinite because it depends from claim 33, which has been canceled. The same applies to dependent claims 40, 41, and 43. It is suggested that claim 39 be amended so as to depend from claim 32.

Claim 65 is indefinite because "the catalyst" at line 1 lacks positive antecedent support in claim 62. It is suggested that claim 65 be amended so as to depend from claim 63.

Claim 66 is indefinite because "the reaction stimulator" at lines 1-2 lacks positive antecedent support in claim 62. It is suggested that claim 66 be amended so as to depend from claim 63.

Claim 67 is indefinite because the term "reaction stimulator" at line 1 lacks positive antecedent support in claim 62. It is suggested that said term be changed to "the reaction stimulator" and that claim 67 be amended so as to depend from claim 63.

Double Patenting

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double

Art Unit: 1753

patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 32, 34, 35, 39-41, 43-50, 52-54, 56-77, 79, 81-89, and 92 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-37 of U.S. Patent No. 6,649,823. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of said patent do not specifically require that the surface on which the vibrationally excited reaction products collide forms a semiconductor diode with one or more semiconductor elements. However, note that claim 7 of said patent teaches that the converter can be a diode. In view of Figure 3 in said patent, and col. 16, line 42 through col. 17, line 17, said surface can be part of the diode, in particular, the conducting surface (110) corresponds to the surface the claims of said copending application, and said conducting surface forms part of a Schottky diode along with semiconductors (111) and (104). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed said surface in the claims of said patent as part of a diode because such is within the scope of the claims of said patent.

13. Claims 32, 34, 35, 39-41, 43-50, 52-54, 56-77, 79, 81-89, and 92 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 and 27-46 of copending Application No. 10/052,004. Although the conflicting claims are not identical, they are not

Art Unit: 1753

patentably distinct from each other because the claims of said copending application do not specifically require that the surface on which the vibrationally excited molecules (claims 40 and 41 of said copending application) collide forms a semiconductor diode with one or more semiconductor elements. However, note that claim 31 of said copending application teaches that collecting excited carriers (i.e., hot electrons) can be with a Schottky diode. Note that Figure 2 in said patent is essentially identical to instant Figure 3. Conducting layer (110) in said Figure 2, forms a diode with semiconductor layer (106), and it is the position such that said layer (110) transfers reaction product energy to electrons as here claimed. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed said surface in the claims of said copending application as part of a diode because such is within the scope of the claims of said copending application

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

14. Applicant's arguments filed February 9 and 14, 2005 have been fully considered but they are not persuasive.

Applicants state they will submit a terminal disclaimer over the patent when the all other rejections are resolved. However, no terminal disclaimer has been received by the Office, and thus, the Examiner maintains the above obviousness-type double patenting rejection.

Art Unit: 1753

Applicant requests that the Examiner withdraw the provisional double patenting rejection over the copending application when all other rejections are resolved. The Examiner will consider doing this when all issues have been resolved.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 571-272-1338. The examiner can normally be reached on Monday through Friday, 5:30 a.m. to 2:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alan Diamond
May 5, 2005

Alan Diamond
Primary Examiner
Art Unit 1753

A handwritten signature in black ink, appearing to read 'Alan Diamond', with a stylized flourish at the end.